CLAIMS

What is claimed is:

1. A method for data estimation is a wireless communications system, the method comprising:

producing a received vector;

for use in estimating a desired portion of data of the received vector, determining a past, a center and a future portion of a channel estimate matrix, the past portion associated with a portion of the received signal prior to the desired portion of the data, the future portion associated with a portion of the received vector after the desired portion of the data and the center portion associated with a portion of the received vector associated with the desired data portion;

estimating the desired portion of the data without effectively truncating detected data, the estimating the desired portion of the data uses a minimum mean square error algorithm having inputs of the center portion of the channel estimate matrix and a portion of the received vector; and

using the past and future portions of the channel estimate matrix for adjusting factors in the minimum mean square error algorithm.

2. The method of claim 1 wherein the received vector comprises at least one code division multiple access signal and the estimated desired portion of the data produces a portion of a spread data vector.

3. The method of claim 1 further comprising adjusting the received vector prior to input into the minimum mean square error algorithm using the past portion of the channel estimate matrix and data previously estimated for a portion of the received vector associated with the past portion of the channel estimate matrix.

4. The method of claim 3 wherein the adjusting the received vector is by subtracting a multiplication of the past portion of the channel estimate matrix with the previously estimated data from the received vector.

5. The method of claim 1 wherein the data estimation is performed using a sliding window approach and the desired portion of data of the received vector is a center portion of the window.

6. The method of claim 1 further comprising producing a noise factor using the prior channel estimate matrix, the future channel estimate matrix and an auto correlation of the noise and the inputs into the minimum mean square error algorithm are the noise factor, the center portion of the channel estimate matrix and the portion of the received vector.

7. A wireless transmit/receive unit comprising:

means for producing a received vector;

means for use in estimating a desired portion of data of the received vector, for determining a past, a center and a future portion of a channel estimate matrix, the past portion associated with a portion of the received signal prior to the desired portion of the data, the future portion associated with a portion of the received vector after the desired portion of the data and the center portion associated with a portion of the received vector associated with the desired data portion;

means for estimating the desired portion of the data without effectively truncating detected data, the estimating the desired portion of the data uses a minimum mean square error algorithm having inputs of the center portion of the channel estimate matrix and a portion of the received vector; and

means using the past and future portions of the channel estimate matrix for adjusting factors in the minimum mean square error algorithm.

8. The wireless transmit/receive unit of claim 7 wherein the received vector comprises at least one code division multiple access signal and the estimated desired portion of the data produces a portion of a spread data vector.

9. The wireless transmit/receive unit of claim 7 wherein the received vector is adjusted prior to input into the minimum mean square error algorithm using the past portion of the channel estimate matrix and data previously estimated for a portion of the received vector associated with the past portion of the channel estimate matrix.

10. The wireless transmit/receive unit of claim 9 wherein the adjusting the received vector is by subtracting a multiplication of the past portion of the channel estimate matrix with the previously estimated data from the received vector.

11. The wireless transmit/receive unit of claim 7 wherein the data estimation is performed using a sliding window approach and the desired portion of data of the received vector is a center portion of the window.

12. The wireless transmit/receive unit of claim 7 wherein a noise factor is produced using the prior channel estimate matrix, the future channel estimate matrix and an auto correlation of the noise and the inputs into the minimum mean square error algorithm are the noise factor, the center portion of the channel estimate matrix and the portion of the received vector.

13. A wireless transmit/receive unit receiving at least one signal and producing a received vector, the wireless transmit/receive unit comprising:

a channel estimation device for use in estimating a desired portion of data of the received vector, for determining a past, a center and a future portion of a channel estimate matrix, the past portion associated with a portion of the received signal prior to the desired portion of the data, the future portion associated with a portion of the

received vector after the desired portion of the data and the center portion associated with a portion of the received vector associated with the desired data portion;

a minimum mean square error device for estimating the desired portion of the data without effectively truncating detected data, the estimating the desired portion of the data uses a minimum mean square error algorithm having inputs of the center portion of the channel estimate matrix and a portion of the received vector; wherein the past and future portions of the channel estimate matrix are used for adjusting factors in the minimum mean square error algorithm.

14. The wireless transmit/receive unit of claim 13 wherein the received vector comprises at least one code division multiple access signal and the estimated desired portion of the data produces a portion of a spread data vector.

15. The wireless transmit/receive unit of claim 13 wherein the received vector is adjusted prior to input into the minimum mean square error algorithm using the past portion of the channel estimate matrix and data previously estimated for a portion of the received vector associated with the past portion of the channel estimate matrix.

16. The wireless transmit/receive unit of claim 15 wherein the adjusting the received vector is by subtracting a multiplication of the past portion of the channel estimate matrix with the previously estimated data from the received vector.

17. The wireless transmit/receive unit of claim 13 wherein the data estimation is performed using a sliding window approach and the desired portion of data of the received vector is a center portion of the window.

18. The wireless transmit/receive unit of claim 13 wherein a noise factor is produced using the prior channel estimate matrix, the future channel estimate matrix and an auto correlation of the noise and the inputs into the minimum mean square

error algorithm are the noise factor, the center portion of the channel estimate matrix and the portion of the received vector.

19. A base station comprising:

means for producing a received vector;

means for use in estimating a desired portion of data of the received vector, for determining a past, a center and a future portion of a channel estimate matrix, the past portion associated with a portion of the received signal prior to the desired portion of the data, the future portion associated with a portion of the received vector after the desired portion of the data and the center portion associated with a portion of the received vector associated with the desired data portion;

means for estimating the desired portion of the data without effectively truncating detected data, the estimating the desired portion of the data uses a minimum mean square error algorithm having inputs of the center portion of the channel estimate matrix and a portion of the received vector; and

means using the past and future portions of the channel estimate matrix for adjusting factors in the minimum mean square error algorithm.

20. The base station of claim 19 wherein the received vector comprises at least one code division multiple access signal and the estimated desired portion of the data produces a portion of a spread data vector.

21. The base station of claim 19 wherein the received vector is adjusted prior to input into the minimum mean square error algorithm using the past portion of the channel estimate matrix and data previously estimated for a portion of the received vector associated with the past portion of the channel estimate matrix.

22. The base station of claim 21 wherein the adjusting the received vector is by subtracting a multiplication of the past portion of the channel estimate matrix with the previously estimated data from the received vector.

23. The base station of claim 19 wherein the data estimation is performed using a sliding window approach and the desired portion of data of the received vector is a center portion of the window.

24. The base station of claim 19 wherein a noise factor is produced using the prior channel estimate matrix, the future channel estimate matrix and an auto correlation of the noise and the inputs into the minimum mean square error algorithm are the noise factor, the center portion of the channel estimate matrix and the portion of the received vector.

25. A base station receiving at least one signal and producing a received vector, the base station comprising:

a channel estimation device for use in estimating a desired portion of data of the received vector, for determining a past, a center and a future portion of a channel estimate matrix, the past portion associated with a portion of the received signal prior to the desired portion of the data, the future portion associated with a portion of the received vector after the desired portion of the data and the center portion associated with a portion of the received vector associated with the desired data portion;

a minimum mean square error device for estimating the desired portion of the data without effectively truncating detected data, the estimating the desired portion of the data uses a minimum mean square error algorithm having inputs of the center portion of the channel estimate matrix and a portion of the received vector; wherein the past and future portions of the channel estimate matrix are used for adjusting factors in the minimum mean square error algorithm.

26. The base station of claim 25 wherein the received vector comprises at least one code division multiple access signal and the estimated desired portion of the data produces a portion of a spread data vector.

27. The base station of claim 25 wherein the received vector is adjusted prior to input into the minimum mean square error algorithm using the past portion of the channel estimate matrix and data previously estimated for a portion of the received vector associated with the past portion of the channel estimate matrix.

28. The base station of claim 27 wherein the adjusting the received vector is by subtracting a multiplication of the past portion of the channel estimate matrix with the previously estimated data from the received vector.

29. The base station of claim 25 wherein the data estimation is performed using a sliding window approach and the desired portion of data of the received vector is a center portion of the window.

30. The base station of claim 25 wherein a noise factor is produced using the prior channel estimate matrix, the future channel estimate matrix and an auto correlation of the noise and the inputs into the minimum mean square error algorithm are the noise factor, the center portion of the channel estimate matrix and the portion of the received vector.

31. An integrated circuit comprising:

an input configured to receive a received vector;

a channel estimation device producing a prior, center and future portion of a channel response matrix using the received vector;

a future noise auto-correlation device for receiving the future portion of the channel response matrix and producing a future noise auto-correlation factor;

a noise auto-correlation device producing a noise auto-correlation factor using the received vector;

a summer for summing the future noise auto-correlation factor with the noise auto-correlation factor;

a past input correction device for receiving the prior portion of the channel response matrix and prior detected data to produce a past input correction factor;

a subtractor subtracting the past input correction factor from the received vector; and

a minimum mean square error device for receiving an output of the summer, an output of the subtractor and the center portion of the channel estimate matrix, the minimum mean square error device producing estimated data.

32. An integrated circuit comprising:

an input configured to receive a received vector;

a channel estimation device producing a prior, center and future portion of a channel response matrix using the received vector;

a noise auto-correlation correction device for receiving the future and prior portions of the channel response matrix and producing a noise auto-correlation correction factor;

a noise auto-correlation device producing a noise auto-correlation factor using the received vector;

a summer for summing the noise auto-correlation factor with the noise auto-correlation correction factor;

a minimum mean square error device for receiving an output of the summer, the center portion of the channel estimate matrix and the received vector, the minimum mean square error device producing estimated data.